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ABSTRACT

After introductory material outlining some of the major challenges facing community colleges today, this paper examines the efforts undertaken by Chabot College, California, to meet the demands of the problems posed by "new students" and fiscal constraints. Described first are Chabot's two mastery learning centers, at which students proceed through a series of media-based learning modules on an individualized open-entry/open-exit basis. Problems encountered in operating the centers and their solutions are discussed in the areas of media selection and/or development, meeting personnel needs using available staff, and flexible scheduling. Next, the paper examines the problem of developing a student record keeping system that would accommodate varying rates of student progress and describes how the following considerations were dealt with in the college's computer-managed student record accounting system: course scheduling, student registration, course enrollment, student attendance, and grading. Additionally, the paper describes the creation of the system's database and files, procedures used in collecting data, the attendance and grade reports generated by the computer, and recovery programs. Finally, results of the first quarter of the system's implementation are reviewed. (AYC)

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A WORKING MODEL

THE LEARNING LABORATORY

and

COMPUTER MANAGED STUDENT RECORD ACCOUNTING

by

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A WORKING MODEL
THE LEARNING LABORATORY and COMPUTER MANAGED STUDENT RECORD ACCOUNTING

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Among the many important discoveries occurring in California Community Colleges during the decade of the 1970's to 1980's was the recognition and acknowledgement that a "different" population of students was seeking higher education. This population rapidly became labelled as the population of the "new student".

The "new student" emerged from diverse groups of individuals representing a broad age range (20 to 80 years old) possessing personal histories which did not follow the more traditional patterns of preparation for higher education, and originating from social, cultural, and economic populaces who had never been encouraged to believe that opportunities for success existed for them in college classrooms.

The "new student" population rocked the foundations of many colleges whose faculty had been trained and whose curriculum had been designed to accommodate literate, goal-oriented, and highly motivated students. Coupled with the emergence of the "new student" population came serious funding constraints imposed by the passage of Proposition 13.

On the other hand, the combination of the perceived needs of "new students" plus the funding constraints imposed by proposition 13 have been the catalysts for many educational delivery system innovations. A number of research projects focusing on the needs of the "new student" produced suggestions for new educational systems which combined student support services with curriculum delivery systems.

One of these concepts was the mastery learning approach. The concept of mastery learning was developed from a combination of programmed learning concepts and tutorial concepts made to fit both vocational and non-vocational learning endeavors in two and four year colleges. Inherent in the mastery learning concept was a degree of dependance on media rather than upon faculty resources. This process tended to lower the variable costs of instruction and substituted these costs with a one-time fixed cost outlay for media and hardware - - a variable cost structure that is centered around paraprofessionals with some form of management support and faculty involvement.

Mastery learning, flexible scheduling, and open-entry open-exit are some of the educational delivery system schemes that have been designed to address and remedy specific problems that are encountered by students and institutions alike. In addition, the combined factors of workplace technology, student characteristics and growth constraints affected the role and function of the community college. These specific problems include:

(1) Student differences in a diverse population -

The rising educational expectations of society, especially in the workplace cause a diverse group of persons who are new to college to partake in course offerings. Many of these people are from families which have had no "college history" ; many of these had been classified as academic underachievers in their past educational experiences. Mastery learning attempts to remedy the poor performance image of these students by providing constant support and feedback to them, while relieving the time pressure experienced in the normal lecture classroom model.

(2) Alleviating student difficulties in basic skills education and understanding -

Deficiencies in basic skills education often go unnoticed in lecture oriented classrooms, especially if objective testing is used. Because mastery learning focuses the information transfer process on media in a "hands-on-environment" the teacher is free to interact with students in a direct one-on-one manner. This process should enhance personal communication and afford teachers and students the opportunity to discuss basic skills deficiencies accompanied by suggestions for possible remedies. Diagonistic testing for individual student placement is another checkpoint which can be used to spot deficiencies in student's

basic skill mastery levels and to guide students toward needed remedial or developmental educational programs.

(3) The opportunity to develop and adapt instructional materials for a locally governed community college- The nature of media centered instruction is such that course content is usually categorized into cogent, related learning modules. These modules represent a progression of concepts or skills that lead the student to his/her academic learning goal. Unlike a textbook which when followed may tend to guide course content, the individual modules consist of material styled to student and community needs in a form that lends itself to change, addition, deletion, or adaptation. This puts the control of course content squarely in the hands of local experts who synthesize their curriculum development through local college groups and local advisory groups.

(4) More flexibility in offering various levels at one time Because instruction is media based, a wide variety of learning activities related to a specific subject can take place simulataneously if permitted by the breadth of the media. For instance, in place of an intermediate typing course students in a media centered environment might be working on statistical typing, technical typing, medical or legal records typing, or whatever specific skill development best fits their

individual interest and learning goal. This is especially important for smaller institutions which may be severely limited in the breadth of lecture oriented course offerings because of class size and faculty scheduling requirements.

(5) Student centered, realistic goals -
Each student is individually assessed through diagonistic testing and personal counseling to arrive at a mutually agreed upon learning contract. This contract is more likely to reflect the realistic learning needs and goals of students than a "catch all" program in a given subject area. Students who need skill or concept upgrades in specific areas can focus on those areas, while students with cumbersome personal calandars can match the learning process to their needs rather than to the needs of an institution.

(6) Transcripts record what is actually mastered and are distinct in the measurement of student learning and mastery level of the subject area -
The record keeping structure can be arranged so that transcripts show the specific subject areas mastered by students rather than a broad category level such as found in a course title like Office Practice. This distinction makes the transcript more reflective of the students learning and should be welcomed by potential employers.

Chabot College, with campuses located in Hayward and Livermore, California, has attempted to remedy some of the problems posed by the "new student" and funding constraints by combining the concepts of mastery learning, open-entry, open-exit, and individualized instruction in an independent learning center format. These learning centers offer courses in mathematics, language arts, business skills, and computer sciences. Students sign up for subject matter areas such as business studies, are assessed by diagonistic testing and counseling, and then are placed in the course which most appropriately matches their skill level and educational objectives. Specific courses may be completed in the amount of time required by the student; these time needs may be less or greater than the time normally prescribed for a traditional course completion.

The academic success of mastery learning endeavors depends upon the quality of instructional media and the adequacy of support services, especially tutoring and counseling. Instructional media must be purchased or developed by the user institution. Without making an extensive evaluation of available media, faculty found through their experiences that media ranges from adequate to spotty or non-existent for skill subjects; in addition, the faculty have discovered that media may be less than adequate for academic subjects.

If adequate media can be arranged to facilitate an offering, student accounting systems become a real problem when mastery learning centers are combined with traditional class offerings. Students sign-up for programs rather than courses and are slotted into the appropriate course depending on the outcome of diagonistic

testing. Transcripts must show the course that the student completed rather than the program in which the student enrolled. The student may complete several courses in one accounting period, or fewer than one course, depending upon the individual rate of progress. Ideally, students may complete courses and initiate courses at times other than the designated beginning or designated end of the quarter or semester. This process will permit those students who complete courses prior to the end of the accounting period the flexibility to begin another course without waiting for a new quarter or semester. The process also serves newcomers to the community at almost any time of the academic year.

Several studies or reports have dealt with the difficulty of staffing mastery learning centers. Faculty must "give up the stage" or central focus of the information transfer process to pre-recorded media and machines. Qualified paraprofessionals and student aides or tutors must be sought out, developed, and trained to assure program consistency and assure each student participating in the program an adequate degree of individual attention. Failure to turn the information transfer process over to selected media or failure to develop of train enough paraprofessionals, student aides, and tutors will make the outcome of the mastery learning project sub-optimal.

The solutions to the problems of staffing, media selection or development, and record keeping have been met varying degrees of success at Chabot College. The way that these problems have been dealt with is described in the following sections.

STAFFING - Most of the faculty involved in mastery learning centers were employed as traditional lecture instructors by the District years before the centers were developed. Nearly every faculty who is currently working in a learning center requested this assignement; however, there have been some incidents of reluctance toward working in the centers especially when dealing with the issues of changing the instructional format from lecture to media. In addition, the consideration of teaching loads had to be tackled with sensitivity. Faculty hired to work in the centers after the centers were established were screened with mastery learning center employment in mind and have generally blended in well with the philosophy of operation.

Funding constraints have made it difficult to hire adequate numbers of full-time, qualified paraprofessionals. Most of the paraprofessionals were hired on a part-time basis and trained in pilot laboratory projects; in fact, many of these employees are graduates of Chabot College's programs and understand the evaluation of coursework offered in the centers.

Student aides and tutors have been available in sufficient numbers after the fall quarter of each year, but retaining qualified students on a year-to-year basis at a community college is a difficult task because of the high attrition rate of the most qualified students. These students are often enticed to better paying jobs in business and industry.

FLEXIBLE SCHEDULING - One of the goals of flexible scheduling is to offer the maximum schedule flexibility to students and at the same time to spread the use of facilities over as many hours as possible to minimize the cost of instructional hardware. If the Center is operating for fifteen hours a day, eight computer terminals offer

one hundred and twenty hours of computer access to students each day. Realizing that all students are not free at all hours to work in the Center necessitates the addition of a buffer factor for hardware. This is to say that while there are in fact one hundred and twenty hours of computer access available from eight terminals during a fifteen hour period, one hundred and twenty students would not be able to use the system for one hour each because of personal scheduling problems. A more useable pattern would be a buffer factor of 50 - 60%, meaning that if one hundred and twenty students are to use a computer system for one hour daily in a center which is open for fifteen hours; it is advised that between twelve and sixteen terminals will be required, depending upon the personal scheduling characteristics of the population being served.

The operation of the Center has shown through usage pattern analysis that students tend to come into the Center when they expect specific teachers to be present. If traditional lecture class scheduling is used for teacher assignment, the usage of a laboratory type facility will tend to cluster around selected faculty assignments. A schedule that assures credentialed coverage at all hours and offers paraprofessional help to students on a direct one-to-one basis during these hours would help to reduce student dependency on a particular faculty member and probably would tend to balance facility usage. Perhaps the Learning Resource Center model is more applicable to a learning center than is the currently used traditional lecture scheduling model.

MEDIA SELECTION AND DEVELOPMENT - Media selection and development have gone well in some subject areas and not so well in others. Rather than adopting the entire offering of one vendor such as Gregg or AVT for business subjects, as many offerings as possible were assessed by faculty. As a result of the faculty's study, that which was considered best to fit the specific needs of the program was purchased. The faculty discovered that for about one half of the subjects planned for the business center there was no acceptable media available. (Exact media being used for specific programs is detailed in Appendix A.)

Media development required more than faculty enthusiasm and an SLR camera. First, the educational outcomes for the course being planned must be detailed in specific, operating terms and then broken down into cohesive components or modules. Many times special care must be taken to insure that these modules are independently cogent if they are to be used as stand-alone components for various course offerings, i.e., Amortized Loan Formulations to be used in accounting and business mathematics.

Once the pedagogical details of a course offering are worked out, and specific progressions of materials are decided upon, the media presentation which will best handle the job must be selected. Qualified media technicians and appropriate facilities must be provided at the location of the material development so that the originator of the material, the facilities and hardware, and the media technicians can work together in an environment similar to the one in which the materials will actually be used. Important components are sufficient planning time for faculty and the provision of adequate financial backing. Anything less than these

committments will result in inferior media and inferior instruction, because the instruction is essentially based upon the media. The faculty charged with developing media for the Business Center at Chabot College - Valley Campus have not been able to combine their talents with those of media technicians due to funding constraints, and the process of media development has been seriously hampered because of this fact.

COMPUTER MANAGED STUDENT RECORD ACCOUNTING -

The District elected to do a pilot system for 1980-81, evaluate the results, and then decide what the District-wide practice would be for future laboratories. Several approaches had been discussed in the past. For example: The student would fill out a document for each session of a course attended. The information required would be:

- Student identification
- Course identification
- Time of day in
- Time of day out

These documents would be accumulated and then scanned into the central computer each day. It was estimated that 3,000 such documents a day could be expected. This meant handling and storing 150,000 documents for a 10-week quarter. Because of the high volume of transactions, alternatives were sought.

Resources were made available to automate the data collection aspects of the system. The decision was made to scan the required data for each hour of each student in attendance: this process was

accomplished by using a stand-alone micro-processor based computer system to control the scanner, process the scanned data, and store the data as well. This decision was based on the model known as distributed data processing, i.e. placing computer power and data at remote cites from the traditional centralized information processing center. Considerable time and effort were spent in getting the real problems defined in order that a computer-based system could be designed and integrated into the existing information processing system.

Course Scheduling:

Generic programs (a holding program for a number of courses) were established to allow a student to pick a particular subject and a preferred day/time frame for the program. Students could enroll for one or more generic programs and would later be slotted into specific courses depending upon the outcome of diagnostic testing and counseling.

Student Registration:

No changes were made in the registration procedure.

Student Enrollment:

Students were to be allowed to enroll in the laboratory. It was necessary for the students to verify their registration before they were established on the local computer. There was a manual effort to keep the central and local data bases in synchronization by following the normal course-add procedure in addition to the local add procedure.

Student Attendance:

Attendance data for each student, each hour, were collected

against the generic program. The student used the same document for scanning the entire quarter. This document had the student I.D. and the generic program I.D. in scannable format. After grades in specific courses (modules) were issued, the attendance totals were transferred to the specific courses so that the maximum (TPHA) attendance would not be exceeded for a particular course. When students completed a particular course (module) within a generic program, they continued on to another particular course within the same generic program without reenrolling.

Student Grades:

Grades were assigned as modules were completed. Under certain conditions some grades (drops) were automatically assigned. It was necessary when relating to drops to keep both the central and local data bases in synchronization. This process provided accurate information relating to student load for those students receiving financial aid.

Data Base Creation

Several days before the first day of class, data were transmitted from the central to the local computer; all files for use during the quarter were created.

Attendance Collection

A single program with the ability to perform twelve unique functions was developed to handle attendance collection, grade entry, and all necessary maintenance for the files involved in the task. This single program was activated first thing in the morning and runs the entire day (barring unforeseen problems). The person responsible for the computer can cause any of the 12 functions to

operate as necessary, but the bulk of the time was spent for attendance collection.

Reporting

Towards the end of the quarter an audit file was created on the local computer and transmitted to the central computer. An audit was performed, and differences were reported to the people in charge of the local computer; corrections are made. This was done to minimize problems during grade and cumulative attendance reporting.

At the end of the quarter, all data relating to grades and attendance are transmitted to the central computer. These data are processed so that they feed into the normal positive attendance and grading functions. Errors, if any, will be reported and handled manually. One other reporting program provided several local reports for use in the laboratory which made grade and course reporting easier to accomplish.

Instructional

Weekly reports detailed each student's attendance by generic program for that week and cumulative attendance for the quarter to date. The module (course) in which the student has been enrolled is printed on this report. An exception report was generated which lists students and their home telephone numbers so that students may be contacted if their attendance for the week has fallen below a selected level. This procedure provided for quick follow-up with students who may be experiencing difficulty which had not come to the attention of the responsible faculty member.

Other reports included periodic lists of students who had not

been assigned to a specific module (course) and a report which showed students who were in specific courses but had not received grades. Later in the quarter, reports of grades by both generic program (detailed by specific course) and aggregated specific courses were generated together with selected statistical analysis. If faculty wish further analysis, they may transmit the records from the local to the central computer and use the facilities of SPSS (Statistical Package for the Social Sciences) to perform whatever analysis is desired.

Recovery

The recovery aspect relied on the premise that the data files will be copied (backed up) each time the main attendance program is stopped for any reason. Ideally this would be once a day. A recovery program would use the back-up data plus the current transactions to create an up-to-date file in case a file is inadvertently destroyed.

Results for the First Quarter

The entire operation went reasonably well. Students accepted the attendance data collection requirements, and in fact, it appeared that the students enjoyed the collection function. This process offered an interesting learning experience for students who have never "been close" to a computer.

The administrative aspects of file maintenance and reporting have required several revisions to accommodate oversights relating to existing requirements or those imposed by the new concepts themselves.

The major problem seemed to be associated with the fact that

it is a distributed system, and as such, the central and local data bases are liable to get slightly out of synchronization. It should be pointed out that this was expected and recognized, and manual procedures, if used properly, should eliminate this problem.

Data transmission errors were anticipated and occurred. Use of better equipment and possible additional software will be required to prevent this problem from occurring. Tracking down such errors is costly and difficult.

The local micro-computer equipment has been satisfactory. It is suspected that power problems and magnetic storage media problems were the big culprits in the random malfunctions encountered.

The pilot system, as hoped, has pointed out the oversights and additional problems which were not considered in the original thinking and planning. Corrections and additions were made, but only if these revisions were vital to the success of the pilot. All other changes will be considered after the system is thoroughly evaluated early in 1981.

CONCLUSIONS - The decade of the 1970's to 1980's witnessed the change in roles for the California Community College from that of a bifurcated university and trade school to that of a comprehensive institution serving a diverse set of needs originating from almost every segment of the local communities served by the Colleges. With this changing role went the responsibility of reshaping the curricular offerings and delivery systems in a way that would better serve this new and diverse student population.

Among the innovations developed or enhanced to help the Colleges adapt to their newly inherited role were flexible open-entry open-exit scheduling, programmed instruction, and mastery learning. Chabot College - Hayward and Chabot College - Valley Campus have actively participated in the development or enhancement of these innovations.

The major problem areas that the faculty and management of the College have experienced involve staffing, media selection and development, and student record keeping. The problems associated with staffing can be solved in time by rigorous screening of new applicants and the training and development of existing faculty who are interested in participating in the innovation of new curriculum and delivery systems. The problems associated with media selection and development will partly be solved in the marketplace as the demand for materials makes development commercially feasible, and partly by financial backing and innovation on the local college level. Problems associated with student record keeping can be solved locally, and one model for solving these problems is presented in this paper.

The search for better ways to accommodate the new population of students and the new set of training demands that are found today in California's Community Colleges is challanging and exciting. The ideas and models presented in this paper represent solutions for some of these demands, and present the problems encountered at Chabot College - Valley Campus along with a report of the manner in which we have attempted to meet these demands and solve some of the problems related to these solutions.

APPENDIX A

SUMMARY OF MEDIA AND MATERIALS USED IN THE

CHABOT COLLEGE - VALLEY CAMPUS BUSINESS LEARNING CENTER

BOS 11
TYPING

MODULES:	TEXTS:
11.1-11.3	AVT 1, By Roderick, 2nd Edition.
11.4	FASTER TYPING, By Hossfield.
11.5	BASIC TYPEWRITING OPERATIONS: PRINCIPLES AND PROBLEMS, By Ligouri.
11.6	AVT 2, By Roderick, 2nd Edition.
11.7	TYPEWRITING SPEED/CONTROL BUILDERS, By Beaumont, Dye, Johnson.
11.8	GREGG EXPERT TYPING KIT, By Gregg.
11.5,11.6 11.8	101 TYPEWRITING, By Thompson, (Optional).

	MATERIALS:
11.1-11.8	AVT Slide/Tapes for Typing.
11.1-11.8	AVT Skill Building Tapes for Typing.

	OTHER:
11.1-11.3	18 Assignments - 2 Tests.
11.4	27 Assignments - 1 Test.
11.5	21 Assignments - 4 Tests.
11.6	2 Assignments - 1 Test.
11.7	28 Assignments.
11.8	21 Assignments - 3 Tests.

BOS 12
SHORTHAND

MODULES	TEXTS:
12.1, 12.2, 12.3, 12.5 12.6, 12.11, 12.12, 12.19A, 12.19B.	GREGG SHORTHAND FOR COLLEGE, Volume 1, Diamond Jubilee, 2nd Edition.
12.1-12.6	STUDENT'S TRANSCRIPTS OF GREGG SHORTHAND FOR COLLEGE, Volume 1, Diamond Jubilee, 2nd Edition.
12.11-12.19B	GREGG SHORTHAND FOR COLLEGE, Volume 2, 2nd Edition.
	STUDENT'S TRANSCRIPTS OF GREGG SHORTHAND FOR COLLEGE, Volume 2, 2nd Edition.
12.1-12.3	STUDENT GUIDE FOR AUTOMATED INSTRUCTIONAL SHORTHAND PROGRAM, AVT
12.8-12.10	MOST USED WORDS AND PHRASES.

	MATERIALS:
12.1-12.3	Shorthand Video Tapes, AVT.
12.1-12.6	Automated Instruction Tapes. AVT.
12.1-12.11	Gregg Shorthand Dictation Tapes, Gregg.
12.8-12.11	Skill Building Tapes, (Made by Instructor).

	OTHER:
12.1-12.3 12.6-12.10	17 Assignments - 14 Quizzes.
12.2, 12,5, 12.8, 12.11, 12.12.	16 Assignments - 12 Quizzes.
12.19A, 12.19B.	30 Assignments - 6 Quizzes.

BUS 15-X
ACCOUNTING

MODULES:	TEXTS:
1A, 1B	ACCOUNTING: THE BASIC FOR BUSINESS DECISIONS, Meigs, Johnson & Meigs, 4th Edition.
	STUDY GUIDE FOR ACCOUNTING: THE BASIC FOR BUSINESS DECISIONS, Meigs, Johnson & Meigs. (Recommended).
	GETTING ACQUAINTED WITH ACCOUNTING, 2nd Edition, Carey & Skousen. (Recommended).
1A	ACCOUNTING WORKSHEETS, GROUP A PROBLEMS, CHAPTERS 1-14, Meigs, Johnson & Meigs.
	INTRODUCTORY ACCOUNTING, Grant. (Recommended).
1B	ACCOUNTING WORKSHEETS, GROUP A PROBLEMS, CHAPTERS 15-28, Meigs, Johnson & Meigs.
	WORKTEXT FOR AVT ACCOUNTING, Morgenstein & McGrath Et. Al. (Recommended).
51	CAREER ACCOUNTING FUNDAMENTALS, McQuaig.
	WORKBOOK/WORKING PAPERS, McQuaig.

	MATERIALS:
1A	Cassette Tapes to accompany Grant Readings.
1B, 51	AVT Slide/Tapes for Accounting.

	OTHER:
1A, 1B, 51	10 Assignments - 6 Exams.

BUS 55-X
BUSINESS MATHEMATICS

BOS 13
MACHINE TRANSCRIPTION

MODULES:	TEXTS:
0010	BUSINESS MATHEMATICS, Miller & Saltzman.
	STUDENT WORKBOOK FOR MATHEMATICS, Edwards, Shaw & Williams.
	MATERIALS:
0010	Audio Tapes, Foreman.
	AVT Slide/Tapes for Business Math.
	OTHER:
0010	10 Assignments - 6 Exams.
	TEXTS:
13.1, 13.3	GREGG REFERENCE BOOK, By Gregg.
13.1	TYPING MAILABLE LETTERS, By Liles, Brendel & Krouse.
13.3	IBM EXECUTARY DICTATION PROGRAM, (Provided by Chabot).
	MATERIALS:
13.1, 13.3	Slide/Tapes (Made by Instructor).
	OTHER:
13.1	24 Assignments - 7 Tests.
13.3	11 Assignments - 4 Tests.

BOS 14
WORD PROCESSING

BOS 16
BUSINESS CALCULATIONS

MODULES:	TEXTS:
14.1, 14.2, 14.3.	WANG WORD PROCESSOR TRAINING BOOKS, (Set of 3).
	MATERIALS:
14.1, 14.2, 14.3.	Wang Cassette Tapes.
	OTHER:
14.1, 14.2, 14.3.	25 Assignments - 5 Quizzes.
	TEXTS:
16.1, 16.2, 16.3.	MACHINE CALCULATION FOR BUSINESS AND PERSONAL USE, 2nd Edition, by Gil Ribera.
	AVT WORKBOOK FOR BUSINESS MATHEMATICS.
	MATERIALS:
16.1, 16.2	AVT Skill Building Tapes, (Typing).
	Slide/Tapes (Made by Instructor).
	OTHER:
16.1	22 Assignments - 1 Test.
16.2	25 Assignments - 1 Test.

SPEEDWRITING

BUS 50-X
DATA PROCESSING

MODULES:	TEXTS:
8002, 8003	PRINCIPLES OF SPEEDWRITING, Landmark.
	SPEEDWRITING WORKBOOK, Landmark.
	SPEEDWRITING DICTIONARY, Landmark, (Optional).
	MATERIALS:
8002, 8003	Slide/Tapes, (Made by Instructor).
	Speed Dictation Tapes, (Made by Instructor).
	OTHER:
8002, 8003	30 Assignments - 25 Quizzes.
	TEXTS:
5001	INTRODUCTION TO COMPUTERS AND DATA PROCESSING, Shelley & Cashman
	MATERIALS:
5001	Data Processing Video Tapes, Bell & Howell.
	OTHER:
5001	10 Assignments - 10 Tests.

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